

A survey on the critical care nurses' training needs: a literature systematic review

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ABSTRACT

Introduction: critical care nurses must develop skills that ensure efficiency and quality in the care process. This review aims to identify the survey methods for the critical care nurses' training needs, determine their necessary core skills, and highlight the importance of specific and standardized training programs.

Materials and Methods: a literature systematic review was conducted between January and April 2023, and it included studies published between 2013 and 2023 from four databases, excluding those relating to training on COVID-19 or to the pediatric/obstetrics-gynecology field.

Results: after a selection based on inclusion and exclusion criteria and qualitative evaluation, 23 studies that appropriately answered the research question were included.

Discussion and Conclusions: the analysis identified the most widely used survey methods for the critical care nurses' training needs and determined their necessary core skills; moreover, it highlighted the importance of specific, permanent, and internationally standardized training programs to be developed from the detected nurses' training needs.

Key words: intensive care unit, emergency, nurse, training needs, education needs, education needs analysis.

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Introduction

The constant technological development that characterizes our era entails a continuous adjustment of the healthcare setting. In addressing such challenges, the training of healthcare workers – professional nurses in particular – needs constant updating to keep up with our society's rapid changes; it is necessary to balance personal needs and users' demands to ensure efficiency and quality in the care process.¹⁻³ Therefore, scientific, technological, and ethical nursing competencies must be developed through continuing training^{4,5} both to improve them and to reach a higher level of accreditation; hospitals, academic associations, and universities in South Korea, for instance, have been providing clinical nurses with continuing training through training courses, workshops, seminars, certification courses, and master's degrees/PhDs.² However, the implementation of training courses is not sufficient to ensure the improvement of professionals' skills and levels of satisfaction; it is paramount to analyze nurses' educational needs when designing their training programs, thus allowing the development of specific and focused programs that include a definite range of training activities based on a definite order of priorities.³ Furthermore, the economic aspect must not be underestimated; hospitals face high costs to train their personnel, so creating and designing permanent training programs based on the educational needs of target groups is a priority.^{6,7} Therefore, evaluating the efficacy and the effect that focused training programs have on the development of the corporate organization is a crucial issue:⁸ in-service training, in fact, reduces corporate costs, turnovers, and employees' absenteeism while increasing organization efficiency, employees' skills and, in general, hospitals' productivity.⁶ So, nurses' training programs should be aimed at achieving goals that meet both employment and organization needs, for instance, providing better service, reducing costs, and increasing employee satisfaction.^{6,7} This review focuses on surveying the training needs of critical care nurses, who are the first ones to take care of patients in the critical stage of the disease;⁹ it is fundamental that these professionals are able to promptly identify signs and symptoms of deterioration in patients with a severe medical case in order to offer proper care and it is, therefore, necessary for them to be provided with adequate training to ensure high-quality care.¹⁰ In this specific care setting, the nursing practice requires a combination of theoretical knowledge, previous experience, and cognitive domains for an accurate and rapid decision-making process and for an efficient identification of priorities of care. Besides, working in critical care units – emergency room and intensive care – requires accurate knowledge of new technologies and electromedical equipment, as well as soft skills, awareness of social challenges, ability to work as a team and to interact with other professionals but also specialist medical and surgical skills.^{10,11} For this reason, the nurses' training needs are not only defined by scientific societies but also and above all, by the professionals themselves; through proper surveys aimed at identifying self-perceived training needs, they can highlight their deficiencies in specific skills of critical care. Even if continuing training leads to excellence in the care process, an internationally standardized continuing training course for critical care nursing has not been conceived and implemented yet.¹² This analysis is aimed at examining – through a systematic review – the methods used to survey critical care nurses' training needs and it also detects which skills nurses themselves think priority should be given to.

Materials and Methods

The review was structured according to the indication in the PRISMA-P (Preferred Reporting Items for Systematic reviews and Meta-Analysis extension for Systematic review protocols) checklist.¹³

A literature systematic review was conducted on four medical and scientific databases (Pubmed, Cinhal, E-Journal, Psycinfo) between January and April 2023 and it was aimed at identifying the main survey methods for the critical care nurses' training needs. The research was filtered so to include only the articles published between January 2013 and April 2023, as established by inclusion criteria. The results were exported and aggregated through a citation manager (Zotero) to organize the bibliography. The source selection process is summarized in a PRISMA flow chart (Prisma 2020 Flow Diagram; Figure 1).¹³ The search terms selection was carried out using the following PIO framework: Participants, nurses working in critical care and intensive care units; Interventions, a survey on the critical care and intensive care nurses' training needs; Primary Outcomes, identifying the survey methods for critical care nurses' training needs and considering the necessity of various levels of post-basic training courses, according to quality and efficacy evidence; Secondary Outcomes, identifying core skills and knowledge to be developed and improved through training as well as the training methods to use in order to achieve such goal.

The search string on PIO was: (nurs*) AND [(education) OR (training needs) OR (education needs) OR (education needs analysis)] AND [(emergency) OR (critical care) OR (intensive care unit)] NOT (covid-19). Every search string term was searched in the title.

Inclusion/exclusion criteria

Inclusion criteria

The articles considered were in English, Italian, and Spanish; they were about “human beings” with no gender or age limits; they were available in full-text and only related to training in critical care nursing; specifically, only articles about surveying the critical care nurses' training needs were included.

Exclusion criteria

Studies about training programs not addressed to nurses, articles about nursing students' training needs and/or training or about educational programs for patients, studies about care settings different from intensive care/emergency, and studies about highly-specific and mono-sectorial processes or not related to post-graduate training programs or courses were excluded, as well as articles about critical care nurses' training related to Sars-Cov2 virus and articles related to the pediatric and obstetrics-gynecology fields.

Qualitative evaluation

The qualitative evaluation of the studies was carried out through JBI instruments¹⁴ by using the specific checklists for each type of analysis (Critical Appraisal Tool for studies reporting prevalence, Critical Appraisal Tool for systematic reviews, Critical Appraisal Tool for text and opinion papers, Critical Appraisal Tool for qualitative research, Critical Appraisal Tool for diagnostic test accuracy studies, Critical Appraisal Tool for analytical cross-sectional studies). The qualitative evaluation of each included study was carried out by two authors independently.

Items labeled as “unclear” were not considered “evaluable items.” To be included in the analysis, each study had to score at least 75% on the employed checklist.

Results

The source selection process used a PRISMA 2020 flow chart¹³ [Figure 1], serving a dual function of guide and graphic synthesis for each phase.

The research led to 679 articles from databases and 2 additional documents from free search, with a total of 681 articles that were exported into Zotero citation manager software; 398 duplicates were removed.

The remaining 283 articles underwent the following screening phase in which titles and abstracts were analyzed for each source. Based on inclusion and exclusion criteria, the screening excluded 207 articles, while the remaining 76 were selected for the full-text analysis.

This last phase led to the exclusion of 47 articles, since they didn't meet inclusion and exclusion criteria for the following reasons: 10 articles were excluded because they concerned critical

care nurses but not specifically the surveying of their training needs; 1 study concerned the presence of family during cardiopulmonary resuscitation maneuvers; 10 studies were excluded because they concerned training addressed to specific critical care fields (maxi-emergency training, complications of mechanical ventilation, managing ECMO, managing physical restraint or reduction of sepsis) but they did not concern the surveying of training needs; 15 articles were excluded because they concerned the organization of critical care nurses' training programs but did not mention the survey methods for training needs; 2 articles concerned critical care training for nursing students; 7 articles concerned mannequin-based simulation teaching method, 2 studies were only available in Chinese.

3 other articles were excluded because they were not available in full text.

3 out of the 26 selected articles were insufficient according to the qualitative evaluation carried out through the JBI Critical Appraisal Tool,¹⁴ following the criteria illustrated in the previous paragraph.

Therefore, 23 studies were included in the final review: 2 systematic reviews, 1 quasi-experimental study, 19 descriptive observational studies and one editorial.

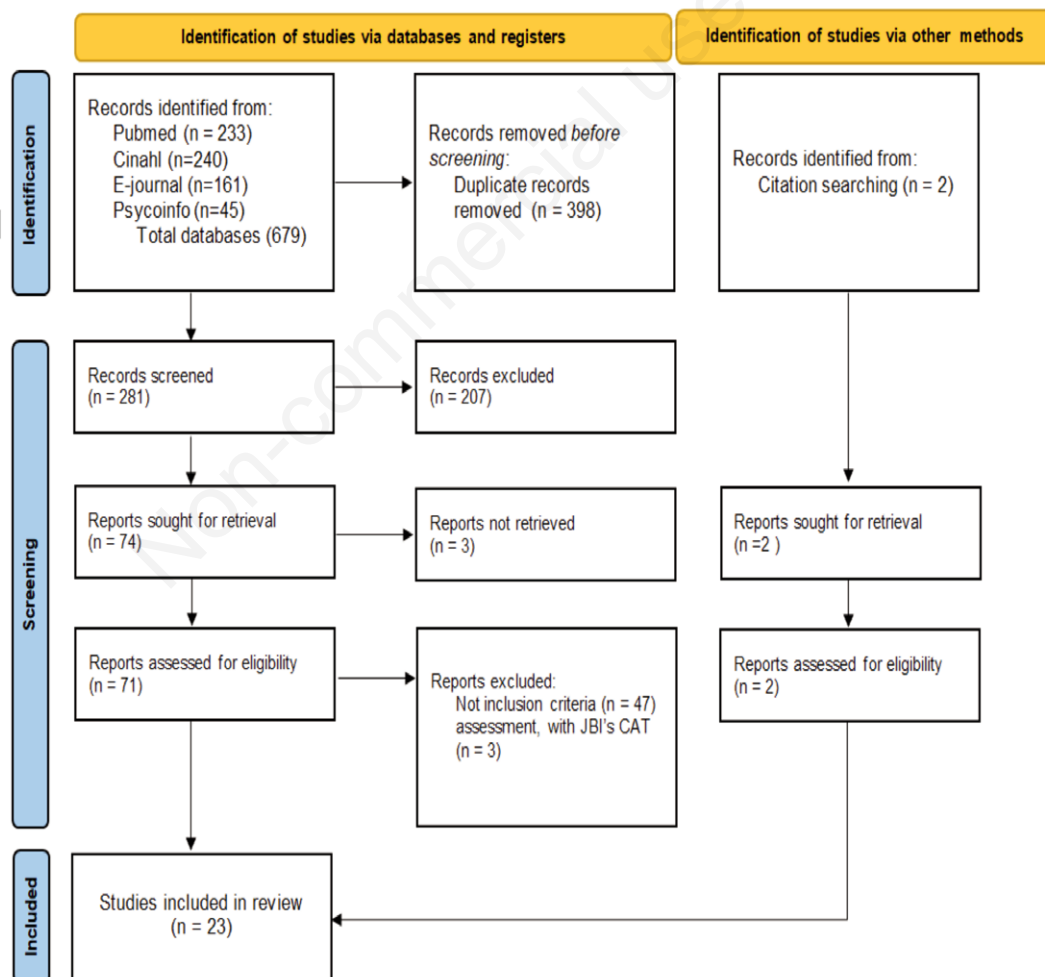


Figure 1. PRISMA flow diagram.

Presentation of the main results

Studies show that nurses are aware of the importance of implementing proper standardized and specific critical care training programs aimed at developing core skills. The main survey methods for critical care nurses' training needs are questionnaires with semi-structured interviews,^{1,9,15-27} self-report interviews^{2,6,12} and focus groups.²⁸ Moreover, critical care nurses believe that their primary skills should be correct CPR (Cardiopulmonary Resuscitation) with full mastery of BLS (Basic Life Support-Defibrillation) and ALS (Advance Life Support) protocols, while the most effective teaching method is the mannequin-based simulation.^{2,24,25}

Data extraction table

Supplementary Table 1 reports the articles included in the analysis and describes and summarizes the study's main features and results. The table consists of different columns: title and summary, year of publication, author, journal, country, study design, study timing and setting, sample size, outcomes, and main results.

Discussion

This analysis led to identifying the main survey methods for critical care nurses' training needs and highlighting the importance of properly detecting training needs - starting from nurses' self-perception of their knowledge - also shining a light on the necessity to create and implement specific, standardized, and permanent training programs specifically conceived for critical care nursing.^{17,29}

In wider terms, a permanent educational process in the healthcare field aims at making a change that - along with the necessity to improve service - translates into qualification activities that foster improvement in health services.¹ From this perspective, several authors highlighted the necessity for critical care nurses to develop specific skills through training aimed at reaching the highest level of competence:^{9,15,20,23} in a 2022 study by Santana-Padilla *et al.*, critical care nurses find it necessary to develop skills related to patient care, communication, and clinical safety; they identify onboarding programs for new nurses, continuing and focused training, and long-term evaluation of the impact of training as fundamental training instruments.²³

In the research by Azizi *et al.*, three main themes - as well as categories and subcategories - identify and classify critical care nurses' fundamental training needs: such themes include the necessity of comprehensive and continuing education related to routine care in an emergency (drugs and sera management, knowledge of documents, *etc.*), patient safety management (infection control, risk of falling, *etc.*), and continuing training in general.¹⁵ In another study by Santana-Padilla, published in 2019, critical care nurses' theoretical and clinical skills are investigated and classified in three stages of learning: basic skills are essential knowledge that critical care nurses should have (breathing and circulation assessment, CPR); intermediate skills are developed through experience (assistance for endotracheal intubation, pelvic bandage); advanced skills are those that require a higher level of expertise and critical thinking (arrhythmias interpretation, *etc.*).¹² In the research by Dulandas *et al.*, nurses assessed their training needs with respect to six areas (trauma, cardiac, neurological, respiratory, equipment management and short refresher courses): most of those being interviewed stated to have not received focused training before

working in critical care and almost half of them indicated general low levels of self-perceived competence. The following skills were held to be fundamental by critical care nurses who took part in the study: correct performance of CPR with full mastery of BLS and ALS; correct management of major trauma; correct use of GCS (Glasgow Coma Scale); correct use of advanced electromedical equipment (NIV, Non-Invasive Ventilation); pain management and proper pharmaceutical knowledge; maxi-emergency training and disaster preparedness; management of patients in state of agitation (mental health disorders, substance abuse); triage training; management of pediatric, obstetric and orthopedic emergencies.⁹ The study by Vatani *et al.* also identifies CPR performance in adults, cardiac monitoring, and management of mechanical ventilation as fundamental skills according to critical care nurses themselves.²⁴ Regarding mechanical ventilation, Guilhermino *et al.* confirm the necessity of implementing training courses on the matter - especially for inexperienced and newly recruited nurses - through interactive teaching in the field.²⁷ As far as self-perceived preparation level is concerned, a study by Jeshvaghani *et al.* shows that nurses consider themselves to be prepared with regard to basic competencies but not to have sufficient clinical reasoning skills; this underlines the necessity to increase continuing educational programs and to develop clinical reasoning through methods such as group discussion and mannequin-based simulation, and it also recommends annual training and re-training courses.²⁶ A peculiar study by Han and Lee reports emergency nurses' perception of their forensic nursing skills: most of those being interviewed stated to be aware of the importance of providing proper forensic nursing assistance but declared not to be able to do so due to a lack of education.²⁵ Some of the examined studies - in addition to illustrating the training needs expressed by nurses - also show their perception of factors that can possibly hinder the fulfillment of training needs: in the research by Azizi *et al.* and Gosselin *et al.*, organizational barriers (such as lack of suitable space in the emergency room, lack of educational facilities, excessive workload, and shortage of time due to the amount of work shifts) and personal factors (low self-confidence, low motivational levels, excessive fatigue) are identified as hindering factors for continuing and adequate training programs.^{15,30} Moreover, hindering factors in low and medium-income countries also include a lack of economic resources²¹ and educational isolation.²⁸ However, the investigation by S. Yektatabab shows that also ineffective teaching methods, inappropriate educational programs' contents, and inappropriate planning of available courses can be hindering factors.⁶ On the other hand, strategies that foster participation in training programs and achievement of necessary skills include systems that monitor nurses' satisfaction levels, evaluation methods and feedback, the development of dedicated infrastructure, and the use of applications on mobile devices;¹⁵ some examples include participation to training activities, computer and internet access, quality of organization in continuing training activities, and access to scientific literature.³⁰ So, when critical care assistance is concerned, it is essential to consider the complexity of the target population; for this reason, it is necessary to obtain a wider range of specialist knowledge through the identification of basic and advanced standards of skills: an internationally recognized specific training program - that allows nurses to specialize in critical care - is a guarantee for users that they will be provided with quality service by competent and qualified personnel.²⁰ Hence, there is a necessity to reconceptualize the training curriculum to properly address the current needs of critical care assistance, especially since the nurse position is becoming increasingly demanding, specialized, and assigned with greater professional autonomy even in managing complex procedures and technologies.²⁹ A study by Kim and Choi emphasizes the necessity of

continuing and repeated training that involves programs aimed at fulfilling high training needs: the two authors consider training based on simulation to be the most efficient method to improve critical care nursing skills since it reduces complications and increases nurses' satisfaction; for this reason, it is recommended as a fundamental educational method when designing a critical care standardized training program.² Investing in critical care nurses' training affects the operating units as well as the hospital setting in general.²⁴ the study by Ireland *et al.* gives an example of efficacy by showing the high level of satisfaction of critical care nurses involved in a one-day training program about management of major trauma.¹⁹ Despite many facts and several attempts, to this day, there are no uniform protocols for the standardization of critical care nurses' training programs:²³ the European Federation of Critical Care Nurse Association (EfCCNa) developed a series of international consensus documents aimed at achieving – through a structured training program - uniform and standardized skills (from technical to behavioral and emotional) but no effective implementation followed.^{12,31} In Spain, the Spanish Society of Intensive and Critical Care Medicine and Coronary Units tried to develop specific and advanced accreditation training, but it resulted in an isolated attempt that received no support from public or private institutions.²³ When trying to guarantee standardization of training programs, it is required to develop practice and evaluation standards: in this regard, the study by J. Gill *et al.* suggests the development of a new clinical evaluation tool in Australia called Standard of Practice and Evaluation Critical Care Nursing Tool (SPECT) which seems to have clinical feasibility by providing clear definition of practice standards and skills that nurses should achieve after a critical care nurses' training program.³²

Conclusions

The review exhaustively met the research objective by highlighting the importance of implementing permanent, standardized, and continuing training programs as the main strategy to improve skills and professional qualification – especially for critical care nurses – and by underlining the necessity to implement training programs based on the training needs expressed by nurses themselves. Despite evidence of the necessity of structured, continuing, and standardized programs required by the professionals, a specific, standardized, uniform and international critical care nursing training program has not been created yet.

This analysis is a cause for reflection for future studies aimed at identifying survey methods for training needs and necessary core skills according to critical care nurses; hopefully, it is also a starting point for future design and implementation of a focused and standardized training program that allows the development of advanced skills in critical care so to guarantee high levels of assistance and staff satisfaction.

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Online Supplementary Material.

Supplementary Table 1. Data extraction table: main features and results of the studies included in the literature review.

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